

## Effect of cocoa's theobromine on metabolism and on plasma metabolomic profile in young rats

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### ***Background and objectives:***

Cocoa intake influences carbohydrate and lipid metabolism. This study aimed to assess the relevance of theobromine in the cocoa effects on metabolism and inflammatory activity, together with its impact on plasma metabolic fingerprint.

### ***Methodology:***

Young female Lewis rats were fed with either standard food, a diet containing 10% cocoa (CC group) or a diet containing the same amount of theobromine provided by 10% cocoa (TB group). After one week, an untargeted metabolomics analysis of plasma samples was carried out. Moreover, some metabolic variables, as well as the gene expression of hepatic and adipose tissue molecules associated with inflammation were quantified.

### ***Results and conclusions:***

The metabolomics study tentatively identified six endogenous and exogenous metabolites (i.e., theobromine) as discriminants of cocoa and/or theobromine consumption. The presence of plasma theobromine inversely correlated with the weight of retroperitoneal fat and spleen and the body weight. In addition, plasma theobromine positively correlated with higher plasma HDL-cholesterol. Both diets decreased hepatic triglycerides and fat faecal content. Furthermore, CC and TB diets decreased the mRNA levels of CD8, IL1- $\beta$  and IL-10 in liver whereas increased that related to macrophages in adipose tissue, although the effect on the gene expression of other molecules was not identical in both groups.

In conclusion, theobromine intake induces a particular metabolic fingerprint, similarly found in cocoa- and theobromine-fed animals. Theobromine seems to be the main responsible for the changes found in metabolic variables.

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